

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1-15 (cancelled)

16. (currently amended) A traceable ~~Traceable~~-method for encrypting and/or decrypting data broadcast by at least one transmitter towards several decoders, this method enabling the identification of a traitor, amongst different lawful users of the decoders, who has communicated secret data to a non-authorized third party so that this third party is able to encrypt and/or decrypt data broadcast by the transmitter,

in which:

- during encryption of the broadcast data, the transmitter applies at least a first secret cryptographic function, and

- during decryption of said broadcast data, all the decoders apply at least one same second secret cryptographic function identical to said first function or its inverse, each decoder having recourse for this purpose to a mathematical description of said second function recorded in a memory,

wherein during the application of the second function the mathematical description of this second function, to which

each decoder has recourse, is different from one decoder to another or from one group of decoders to another so that the mathematical description to which recourse is made exclusively identifies the particular decoder or group of decoders among all the decoders.

17. (currently amended) The method ~~Method~~ as in claim 16, wherein the second cryptographic function is able to process non-redundant data.

18. (currently amended) The method ~~Method~~ as in claim 16, wherein said mathematical description ( $F_{kj}$ ) recorded in the memory of each decoder is formed of several elementary functions ( $G_{i,j}$ ) which must be composed with each other in a determined order to form said second secret function.

19. (currently amended) The method ~~Method~~ as in claim 18, wherein each elementary function ( $G_{i,j}$ ) is equal to the composite of at least three functions as per one of the following equations:

$$G_{1,j} = f'_{1,j} \circ g_{\sigma j(1)} \circ S$$

$$G_{2,j} = f'_{2,j} \circ g_{\sigma j(2)} \circ f_{1,j}$$

.....

$$G_{r-1,j} = f'_{r-1,j} \circ g_{\sigma j(r-1)} \circ f_{r-2,j}$$

$$G_{r,j} = T \circ g_{\sigma j(r)} \circ f_{r-1,j}$$

in which:

- $G_{i,j}$  is the  $i$ -th elementary function of decoder  $j$ ,  $j$  being the index identifying a decoder or group of decoders,
- functions  $f_{i,j}$  and  $f^{-1}_{i,j}$  are predefined functions able to render the elementary functions  $G_{i,j}$  non-commutative between each other,
- $\sigma_j$  is a permutation of all indices  $\{1; \dots; r\}$  unique to each decoder or group of decoders,
- $g_{\sigma_j(t)}$  is the  $\sigma_j(t)$  -th function of a predefined whole formed of  $r$  non-linear predefined functions  $g_i$  commutative between each other, and
- $S$  and  $T$  are predefined functions able to render difficult the cryptanalysis of elementary functions  $G_{1,j}$  and  $G_{r,j}$  respectively,

20. (currently amended) The method ~~Method~~ as in claim 19, wherein each function  $f^{-1}_{i,j}$  is equal to the inverse  $f^{-1}_{i,j}$  of function  $f_{i,j}$ .

21. (currently amended) The method ~~Method~~ as in claim 19, wherein the functions  $f_{i,j}$  are linear functions of a set  $(L^n)$  of the tuples of elements of a finished body  $(L)$  on itself.

22. (currently amended) The method ~~Method~~ as in claim 19, wherein the functions S and T are invertible.

23. (currently amended) The method ~~Method~~ as in claim 19, wherein the functions S and T are linear functions of a set  $(L^n)$  of the tuples of elements of a finished body (L) towards itself.

24. (currently amended) The method ~~Method~~ as in claim 19, wherein the functions  $g_i$  are chosen so that each elementary function  $G_{i,j}$  corresponds to an encryption block of a multivariate encryption algorithm.

25. (currently amended) The method ~~Method~~ as in claim 19, wherein each function  $g_i$  is of the form  $g_i(a) = a^{e_i}$  in which a is an element of an  $L'$  extension of degree n of a basic body L with q elements, and  $e_i$  is a predefined exponent.

26. (currently amended) The method ~~Method~~ as in claim 25, wherein the exponent  $e_i$  is of the form :

$1 + q^{\theta_1} + \dots + q^{\theta_1} + \dots + q^{\theta_i} + \dots + q^{\theta_{d-1}}$ , in which the exponents  $\theta_i$  are predefined integers.

27. (currently amended) A computer-readable Data recording medium with a computer program recorded thereon, ~~wherein it the computer program~~ comprises instructions for the execution of a traceable encryption and/or decryption method according to claim 16, when these instructions are executed by a decoder.

28. (currently amended) A computer readable Data recording medium with a computer program recorded thereon, ~~wherein it the computer program~~ comprises instructions for the execution of a traceable data encryption and/or decryption method as in claim 16, when said instructions are executed by a transmitter.

29. (currently amended) A traceable ~~Traceable~~-system for encrypting and/or decrypting broadcast data capable of identifying a traitor, among different lawful users, who has communicated secret data to a non-authorized third party so that this third party is able to encrypt and/or decrypt the broadcast data, this system comprising:

- a transmitter able to encrypt broadcast data, this transmitter being capable of applying at least a first secret cryptographic function, to directly process a message, then of broadcasting the message,

- several decoders able to decrypt broadcast data, all

the decoders being able to apply a second secret cryptographic function identical to said first function or to its inverse for the direct processing of said broadcast message, each decoder for this purpose being equipped with a memory in which a mathematical description of said second function is recorded;

wherein the memory of each decoder contains a mathematical description of said second function different from the one recorded in the memory of the other decoders or in the memory of the other groups of decoders so that this mathematical description exclusively identifies the particular decoder or group of decoders among all the decoders.

30. (currently amended) The memory ~~Memory~~ intended to be associated with a decoder of a traceable data encryption and/or decryption system according to claim 28, wherein it comprises a mathematical description equivalent to said second secret function able to be used by the decoder, this mathematical description consisting of several elementary functions ( $G_{i,j}$ ) each of which is equal to the composite of at least three functions as per one of the following equations:

$$G_{1,j} = f'_{1,j} \circ g_{\sigma j(1)} \circ S$$

$$G_{2,j} = f'_{2,j} \circ g_{\sigma j(2)} \circ f_{1,j}$$

.....

$$G_{r-1,j} = f'_{r-1,j} \circ g_{\sigma j(r-1)} \circ f_{r-2,j}$$

$$G_{r,j} = T \circ g_{\sigma j(r)} \circ f_{r-1,j}$$

in which:

- $G_{i,j}$  is the  $i$ -th elementary function of decoder  $j$ ,  $j$  being the index identifying a decoder or group of decoders,
- functions  $f_{i,j}$  and  $f'_{i,j}$  are predefined functions able to render the elementary functions  $G_{i,j}$  non-commutative between each other,
- $\sigma_j$  is a permutation of all indices  $\{1; \dots; r\}$  unique to each decoder or group of decoders,
- $g_{\sigma_j(t)}$  is the  $\sigma_j(t)$  -th function of a predefined whole formed of  $r$  non-linear predefined functions  $g_i$  commutative between each other, and
- $S$  and  $T$  are predefined functions able to render difficult the cryptanalysis of elementary functions  $G_{i,j}$  and  $G_{r,j}$  respectively.

31. (currently amended) A computer readable Data recording medium with a computer program recorded thereon, ~~wherein it~~ the computer program comprises instructions for the execution of a traceable data encryption and/or decryption method as in claim 17, when said instructions are executed by a transmitter.

32. (currently amended) A computer readable Data

recording medium with a computer program recorded thereon, the  
computer program ~~wherein it~~ comprises instructions for the  
execution of a traceable data encryption and/or decryption method  
as in claim 18, when said instructions are executed by a  
transmitter.

33. (currently amended) A computer readable Data  
recording medium with a computer program recorded thereon, the  
computer program ~~wherein it~~ comprises instructions for the  
execution of a traceable data encryption and/or decryption method  
as in claim 19, when said instructions are executed by a  
transmitter.

34. (currently amended) A computer readable Data  
recording medium with a computer program recorded thereon, the  
computer program ~~wherein it~~ comprises instructions for the  
execution of a traceable data encryption and/or decryption method  
as in claim 20, when said instructions are executed by a  
transmitter.

35. (currently amended) A computer readable Data  
recording medium with a computer program recorded thereon, the  
computer program ~~wherein it~~ comprises instructions for the  
execution of a traceable data encryption and/or decryption method  
as in claim 21, when said instructions are executed by a  
transmitter.